



SAS® DEMAND-DRIVEN FORECASTING

Integrate advanced analytics into the S&OP process for profitable demand response

Overview

In today's dynamic markets, inaccurate forecasts – from unsophisticated IT systems, biased internal processes or insufficient quality data – put your organization at a competitive disadvantage and prohibit you from driving top-line growth and fulfilling customers' needs. For effective S&OP, traditional ERP/SCM systems lack the analytic sophistication to translate customer and other upstream demand data into a plan to maximize market opportunity and customer satisfaction.

Demand-driven organizations incorporate customer demand signals and market trends in the demand plan accurately, frequently and in real time – while anticipating demand variability to remove the threat to profit margins.

SAS enables profitable demand response through accurate demand forecasts, multi-echelon inventory optimization and “what-if” analyses by anticipating demand changes and factors that drive them, such as changes in engineering specifications, new product launches, promotions or external events.

Challenges

- **Legacy systems** do not support data integration and a workflow to consolidate and reconcile large volumes of information in a structured way for creating accurate forecasts.
- **Collaboration** is hindered by silos of information that aren't communicated enterprisewide, and therefore large amounts of information necessary to create a consensus forecast are not shared.
- **Internal cultural** issues acquired over a long period of time impede a commitment of senior management to use analytics to gain data savvy insight into what's happening in S&OP and, subsequently, gain a competitive advantage.

SAS' what-if analysis and scenario modeling capabilities help assess the financial impact of changing marketing or product mix. With SAS® Demand-Driven Forecasting, translate customer and other upstream data into a demand plan that maximizes profitability, market share and customer satisfaction.



Allocate limited resources to the most profitable products and customers

The solution

SAS combines the power of automation, analytics and workflow to generate the most unbiased and accurate forecast on a large-scale basis. Our solution automatically creates a weighted consensus forecast by tracking variation between forecasted and actuals to aid the S&OP process.

SAS' what-if analysis and scenario modeling capabilities help companies plan for future events, including new product, location and channel introduction, and simulate the impact of possible marketing investment strategies and product mixes to find the optimal forecasting scenario for maximum profitability.

With SAS Demand-Driven forecasting, you can:

- Harness your existing data with powerful analytics through a user-friendly interface.
- Build a workflow designed around your processes.
- Use business intelligence to drive what-if analysis and disseminate the results across your organization to make better decisions.
- Shorten the time it takes to drive your supply chain and realize significant savings in time and money.
- Support a formal S&OP process with strong methodologies that incorporate an understanding of organizational dynamics.

Why SAS?

Demand-driven supply chains deliver return on investment. In fact, according to industry studies, with better demand forecast accuracy, companies average 15 percent lower inventories, 17 percent stronger perfect order fulfillment, and 35 percent shorter cash-to-cash cycle times.

These results cannot be achieved with backward-looking ERP systems. You need the forward-looking perspective of forecasting combined with powerful, advanced analytics to fully understand the impact of trends, seasonal patterns, external events and promotions. SAS Demand-Driven Forecasting is based on advanced analytics to optimize your S&OP process:

- **Large-scale, automated statistical model selection and optimization.** For complex supply chain networks with complex business rules, SAS' patented expert-selection forecast engine analyzes and combines various models to produce a forecast that best depicts a business at every level of the corporate or product hierarchy, for hundreds of thousands of data series.
- **Model repository with specific forecasting methods to meet product portfolio requirements.** Select the appropriate forecast methods to address your product portfolio requirements based on the unique marketplace dynamics of your business. Flexible data modeling allows you to model large and complex forecasting structures and easily make changes to your forecast model.

- **Event modeling console.** Statistically model events to determine sales lifts associated with promotions, special marketing events and other irregular activities. Choose among several event types, including pulse, level shift, ramp up/down, temporary events and pre-programmed holiday events.
- **What-if analysis and scenario planning.** Evaluate exceptions to your sales history and plan for future events. Conduct what-if analysis using statistical models to find the optimal forecasting scenario based on available marketing investment strategies, and change model parameter estimates to determine their effects on forecasts.
- **Advanced Consensus Forecasting Planner workbench.** Import and consolidate internal and external customer forecasts from Sales, Marketing, Finance and others, and automatically create a weighted consensus forecast that can be surfaced as part of a consensus gap report to gain consensus for the S&OP planning process. Forecasts can be averaged or weighted based on past performance, and assessment routines can be performed against financial KPIs to determine the financial impact from a revenue management standpoint.
- **Monitoring, tracking and reporting with alerts.** Provide access across the enterprise by using SAS Web-enabled reports to monitor and track forecast performance and interaction with the consensus planner workbench. Included in the dashboard are alerts to identify key issues related to forecast performance, such as exception reports and iterative reviews of the consensus forecast.

Benefits

Develop a profitable demand plan based on optimal product mix and marketing investment strategies.

Conduct what-if analysis using statistical models to find the optimal forecasting scenario based on available marketing investment strategies. With SAS' scenario analysis, evaluate exceptions to your sales history and plan for future events, including new product, location and channel introduction. Use what-if planning simulations through model parameter estimates to determine the effects on forecasts across the product hierarchy for any situation including realistic, optimistic and pessimistic projections.

Enhance the overall forecasting process and workflow.

Generate a more accurate consensus forecast with gap analysis and strategy reporting across all corporate business units. SAS' advanced consensus forecasting planner workbench, supported by advanced analytics, provides a structured and reliable approach to forecasting. Statistically generated weighted consensus forecasts are created automatically using award-winning, weighted combined forecasting methods.

Gap reports and alerts are generated electronically, indicating the gap between the financial plan, all individual departmental and statistical baseline forecasts, with notes indicating reasons. The reports can be reviewed, changed and written back to the enterprise data

warehouse throughout the consensus forecasting process and in support of the S&OP process.

Reduce finished goods inventory levels and stock-outs.

SAS provides forecasts that reflect the realities of the business, improving your ability to forecast and plan future events with confidence. As a result, safety stock levels can be tightened along with on-hand finished goods inventory, adding more efficiencies to the overall supply chain. Also stock-outs, or backorders, are reduced as the right products are produced at the right time and stocked at the right locations.

SAS also provides a Multi-Echelon Inventory Optimization component as an optional feature to SAS Demand-Driven Forecasting that includes distribution requirements planning (DRP) reporting, sensitivity analysis and scenario planning capabilities.

Improve your forecasting performance across your product hierarchy.

SAS' patented Forecast Server engine has a complete array of advanced forecasting methods, including Exponential Smoothing, Winter's, ARIMA, ARI-MAX, UCM and dynamic regression to model and forecast all products across a company's product portfolio. SAS can integrate consumer demand (pull), model it and forecast it automatically using our award-winning data access tools.

Increasing Margins Through Accurate Replenishment

One of Asia's largest beverages company had to produce and distribute the right quantity and right mix of beverages to meet consumer demand. They used SAS to combine demand data with the replenishment planning process to generate sales forecasts, determine production levels and create distribution plans. The result was reduced inventory, improved production turns, reduced stock-outs and therefore increased margins.

Prior to SAS, the company's different production plants were creating their own forecasts using different tools and processes, sometimes just relying on historical data, resulting in high inventory levels, stock-outs and overstocks for different products at different locations – and high distribution and redistribution costs.

By combining their demand and replenishment data for 100 percent of their products, SAS helped the company create accurate companywide forecasts for 100 percent of their products and locations, and replan their production and distribution – resulting in a 50 percent improvement in production turns and a reduction in inventory-carrying costs (as well as distribution costs) by replenishing accurately the first time.

SAS has more than 6,500 customers using SAS Forecasting to reduce forecast errors and yield substantial reductions in inventories, as well as accelerate revenue and order fulfillment:

- One of the world's largest manufacturers and suppliers of pharmaceutical and dietary products uses SAS to improve its forecasting accuracy and demand planning. Using SAS, the company was able to minimize market share loss due to stock-outs, and reduce last-minute costly air shipments by 26 percent.
- A leading US transportation company uses SAS to determine the right number of locomotives, freight cars and employees, origin-destination combinations, type of locomotives and freight cars for the right products. With SAS, they realized improved forecasts of its time, location, equipment type and crew combinations by over 30 percent – reducing the average error and standard deviation by more than 44 percent for one business unit.

The SAS® Difference

With SAS Demand-Driven Forecasting, SAS sets itself apart from other solutions in many ways as the leader in advanced analytics:

- Only SAS provides a statistical forecasting engine that automatically creates a business/product hierarchy on the fly, automatically assesses every level of the hierarchy to determine the appropriate statistical model and forecasts at each level. With the most scalable statistical forecasting, you can choose to run in batch or through a GUI.
- SAS provides the only solution with such a wide range of statistical methods as well as custom algorithms for forecasting within a hierarchy. Instead of a fixed number of models, SAS supports all model families (time series, ARIMA, Regression, ARIMAX, Intermittent Demand Function and UCM), infinite methods and personalized algorithms.
- No other vendor comes close to offering such depth and breadth to model and predict incremental (lifts) sales volume associated with sales promotions, marketing events/activities and other irregular events that affect sales demand.
- Only SAS offers an integrated what-if simulation and scenario planning plug-in to test various scenarios using the model parameters to determine the impact on the forecast.
- SAS' Advanced Consensus Forecasting Planner Workbench offers automated, statistically driven,

weighted consensus forecasting collection, development and viewing ability with gap analysis monitoring, tracking and reporting with alerts.

This is the only such application on the market using proven combined weighted forecasting methods.

- This award-winning SAS solution provides an interactive dashboard with a balanced scorecard that can be shared to disseminate forecast performance metrics and tracking reports across the enterprise. To refine the weighted consensus forecast as an input into the S&OP process, an interactive group of consensus forecast gap reports with workflow is included.

About SAS

SAS is the leader in business intelligence software and services. Customers at 40,000 sites, including 96 of the top 100 FORTUNE Global 500® companies, use SAS software to manage and gain insights from vast amounts of data, resulting in faster, more accurate business decisions; more profitable relationships with customers and suppliers; compliance with governmental regulations; research breakthroughs; and better products. Only SAS offers leading data integration, intelligence storage, advanced analytics and traditional business intelligence applications within a comprehensive enterprise intelligence platform. Since 1976, SAS has been giving customers around the world THE POWER TO KNOW®.

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